Data General

Data General Corporation, Westboro, Massachusetts 01580

Customer Documentation

The 486 System User's Manual

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MP MASTER

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486 System

User's Manual

May 1993

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IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions carefully. Save these instructions for future reference.

2. Follow all warnings and instructions marked on the product.

3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

4. Do not use this product near water.

5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.

7. This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

8. This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

9. Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.

10. If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet does not exceed 15 amperes.

11. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

12. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage points or other risks. Refer all servicing to qualified service personnel.

13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    a. When the power cord or plug is damaged or frayed

    b. If liquid has been spilled into the product

    c. If the product has been exposed to rain or water

    d. If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal condition.

    e. If the product has been dropped or the cabinet has been damaged

    f. If the product exhibits a distinct change in performance, indicating a need for service

14. Replace battery with the same type as the product's battery we recommend. Use of another battery may present a risk of fire or explosion. Refer battery replacement to a qualified serviceman.

15. Warning! Battery may explode if not handled properly. Do not recharge, disassemble or dispose of in fire. Keep away from children and dispose of used battery promptly.

16. Use only the proper type of power supply cord set (provided in your keyboard/manual accessories box) for this unit. It should be a detachable type: UL listed/CSA certified, type SVT/SJT, rated 6A 125V minimum, VDE approved or its equivalent. Maximum length is 15 feet (4.6 meters).

Canadian Department of Communications

Regulatory Statement

This digital apparatus does not exceed Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radio-électriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Réglement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

FCC Class B Radio Frequency Interference Statement

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/television technician for help.

Notice 1:

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2:

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

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About This Manual

Audience

This user's manual is intended for three general types of readers:

- General buyers and operators running application software in a business or personal-computing environment
- Business and technical purchasers who want to develop software and hardware packages to customize the system for a specific environment
- Readers with technical background such as system designers, programmers and technicians, who intend to modify the system hardware and configure the system

Purpose and Scope

This manual tells how to operate, configure, and upgrade the system.

In addition to the hardware and software information, different system error conditions and how to correct them are also included.

Organization

This manual consists of two chapters and three appendices.

Chapter 1, **System Features**, tells about the features and components of the system board. It describes how to install memory modules, upgrade the CPU and increase VGA memory. It also provides reference materials such as jumper settings.

Chapter 2, **Configuring Your System**, shows how to use the BIOS SETUP utility to configure your system and set up system security.

Appendix A, **Fixed Disk Type Table**, lists the types of fixed disks that can be used in the system.

Appendix B, **Error Messages**, lists system error messages with corresponding corrective actions.

Appendix C, **Address Maps and Interrupt Table**, lists the memory address map and interrupt levels.

Chapter 1

System Features

This system is a high-performance, 32-bit personal computer system based on the 486 series microprocessor. It features single chip upgrade technology which allows maximum ease and flexibility for upgrading the system. It is fully compatible with the IBM PC/AT and is suitable for use as a Windows workstation, CAD/CAE/CAM workstation, UNIX personal workstation or desktop PC.

The maximum system memory size is 36 MB. The system supports 4-MB, 8-MB and 16-MB SIMMs installation in two 72-pin SIMM sockets.

The system architecture is based on VESA VL-bus featuring the on-board VGA. Both VESA master and slave are supported on the VL-bus.

In a LAN environment, the system supports 16-bit Arcnet cards, Ethernet cards and Token Ring cards. It is fully compatible with Novell NetWare and Microsoft LAN Manager and also supports SCO UNIX, XENIX and OS/2.

The system has a number of software-controlled security features. These include power-on password, disk drive read/write control, diskette boot control, serial and parallel port control, and a system setup control.

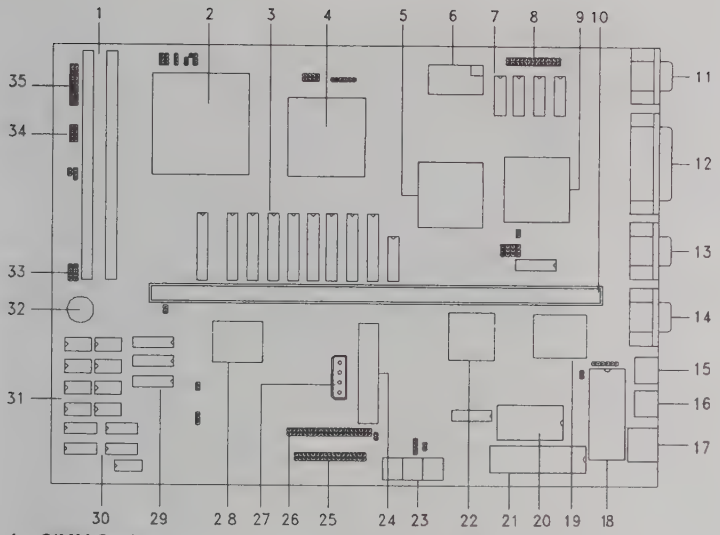
System performance is greatly enhanced by installing optional devices such as memory modules, expansion boards and upgrade CPU. This chapter gives step-by-step instructions on how to expand your system by installing optional devices.

1.1 System Board Layout

Figure 1-1 shows the layout of the system board and the location of the important components.

The system board has the following major components:

- 486SX-/DX- and DX2-series CPU
- socket for upgrade CPU
- 4-MB on-board RAM expandable to 36-MB
- two 72-pin SIMM sockets for 70-ns memory modules
- 98-pin ISA and 112-pin MCA connector for ISA/VESA raiser card (this raiser card has two available options: four-ISA slots with 2 VL-bus slots, and four-ISA slots without the VL-bus slots)
- optional 120-pin ISA connector for raiser card
- System BIOS - 128-KB DIP EPROM
- Optional system BIOS - 128-KB DIP or 128-KB PLCC Flash ROM
- optional on-board cache memory (64-KB, 128-KB and 256-KB) that supports write-through and write-back
- system clock/calendar
- two 9-pin serial ports
- one 25-pin Centronics parallel port
- PS/2-compatible keyboard and mouse interface
- 512-KB/1-MB DRAM for ultra-VGA interface; expandable to 1 MB
- embedded hard disk interface



1 *SIMM Sockets*
2 *PGA CPU Socket*
3 *SRAM Cache*
4 *PQFP CPU Location*
5 *M1419 Chip*
6 *Oscillator*
7 *Video RAM*
8 *VGA Feature Connector*
9 *CL GD5426 VGA Chipset*
10 *Raiser Card Connector*
11 *VGA Connector*
12 *Printer Port*
13 *COM 2*
14 *COM 1*
15 *PS/2 Mouse Connector*
16 *PS/2 KB Connector*
17 *Power Controller Box Connector (optional)*
18 *System BIOS*
19 *I/O Chip*
20 *Real-Time Clock*
21 *KB Controller*
22 *M6357 Power Saving Chip (optional)*
23 *EPA Power Saving Relay (optional)*
24 *Power Connector*
25 *Floppy Disk Drive Controller*
26 *Hard Disk Drive Controller*
27 *Power-Saving Controller Connector (optional)*
28 *M1421 Chip*
29 *VESA Control PAL*
30 *Parity Chip*
31 *On-Board Memory*
32 *Buzzer*
33 *HDD/LED Connector*
34 *Reset Key Connector*
35 *Multifunction Connector*

Figure 1-1 System Board Layout

1.2 Jumper Settings

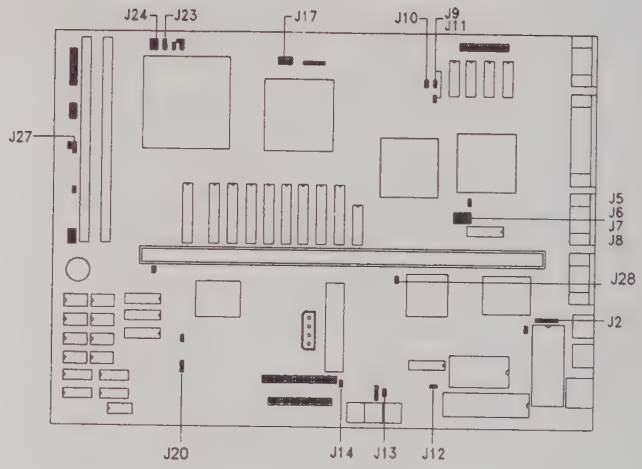


Figure 1-2 Jumper Locations

Tables 1-1 to 1-5 list the user-configurable jumpers on the system board.

Table 1-1 System Board Jumpers

Jumper	Setting	Function
J2	1-2	Enable Password Check
	2-3	Bypass Password
J13	Closed	Enable on-board battery
	Open	Disable on-board battery
J14	Closed	Disable DRAM parity
	Open	Enable parity
J20	1-2	Enable on-board VGA
	2-3	Disable on-board VGA
J27	1-2	Disable Keylock
	2-3	Enable Keylock

Table 1-2 Jumper Setting for Cache RAM Size Selection

J5	J6	J23	J24	Cache Size
2-3	2-3		1-2	64K
1-2	2-3	2-3	2-3	128K
1-2	1-2	1-2	2-3	256K

Table 1-3 Jumper Setting for Cache TAG Selection

J7	J8	J28	Cache TAG
	2-3		Write-Through
	1-2	Open	Write-Back/7 Bit
1-2	2-3	Closed	Write-Back/8 Bit

Table 1-4 Jumper Setting for CPU Type Selection

J9	J10	J11	CPU Type
Open	Closed	Closed	487SX/ODP
Closed	Closed	Open	486DX/486DX2
Open	Open	Open	486SX (PGA)
Open	Closed	Open	486SX (PQFP)

Table 1-5 Jumper Setting for CPU Clock Selection

J17	CPU Clock
3-7	33-MHz
4-8	25-MHz

1.3 Installing Memory

The system supports up to 36 MB of RAM. See Figure 1-1 for the location of the SIMM sockets on the system board. You can install single-density 4-MB, double-density 8-MB, and single-density 16-MB memory modules.

When installing memory, choose one of the SIMM configurations listed in Table 1-6.

Table 1-6 System Board RAM Configuration

On-board	Bank 1	Bank 2	Total Memory
4 MB			4 MB
4 MB	4 MB		8 MB
4 MB	4 MB	4 MB	12 MB
4 MB	8 MB		12 MB
4 MB	4 MB	8 MB	16 MB
4 MB	16 MB		20 MB
4 MB	8 MB	8 MB	20 MB
4 MB	4 MB	16 MB	24 MB
4 MB	16 MB	16 MB	36 MB

1.3.1 Installing a SIMM

Follow these steps to install a SIMM:

1. Find the groove on the bottom of the SIMM. Align this with the bridge located in the middle part of the SIMM socket.
2. Slip a SIMM at a 45° angle into the correct slot with the cut corner facing inward the system board.
3. Guide the SIMM down with both hands to get it straight in.
4. Gently press the SIMM back against the holding clips on both ends of the socket until the peg slips into the holes on the SIMM, and the holding clips lock the SIMM into position. See Figure 1-3.
5. Check that the SIMM is securely seated in its slot, and that both ends are locked to the socket.

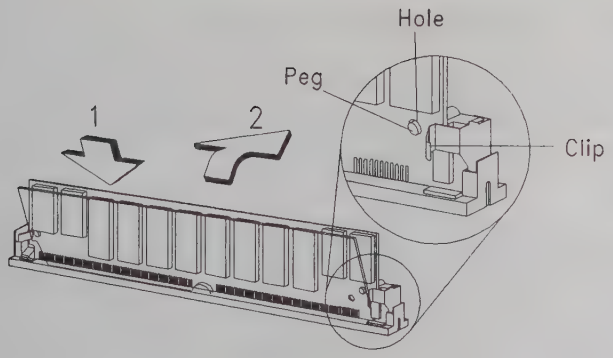


Figure 1-3 Installing a SIMM

1.3.2 Removing a SIMM

1. Press the holding clips on both sides of the SIMM outward to release the SIMM. See Figure 1-4.
2. When the SIMM is free from the holding clips, gently remove it from the SIMM socket.

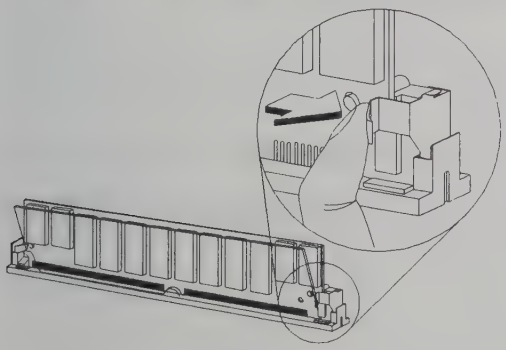


Figure 1-4 Removing a SIMM

1.3.3 Reconfiguring the System

The system automatically detects the size of the additional memory installed. Run Setup to view the new value for total system memory.

1.4 Upgrading the CPU

Conventional technology places the CPU on the same board as the ISA bus logic, system memory and I/O interface. The entire system board must be replaced to upgrade the CPU. The single-chip upgrade technology gives you the flexibility to upgrade the CPU by just inserting a single CPU chip, without replacing the system board.

1.4.1 Unpacking the Upgrade CPU

Unpack all items from the package and inspect the contents. If any of the following items are damaged or missing, contact your dealer immediately.

- Upgrade CPU with heat sink
- Electrostatic discharge (ESD) gloves

1.4.2 Installing the Upgrade CPU

Before installing the upgrade CPU, check the following:

- The heat sink is not oily
- The heat sink is well attached to the CPU

The heat sink serves as a platform for the upgrade CPU to protect it against excessive heat.

Follow these steps to install the upgrade CPU:

1. Turn off the system power.
2. Open the system and locate the CPU upgrade socket on the system board. (Refer to Figure 1-1 for location of the CPU upgrade socket.)
3. Remove the CPU installed in the upgrade socket if there is any.
4. Plug-in the upgrade CPU (with the heat sink) into the upgrade socket. Make sure that pin 1 of the CPU corresponds to pin 1 of the upgrade socket. (See Figure 1-5.) Insert the CPU pins into the socket pinholes gently but firmly. Be careful not to bend any pins.

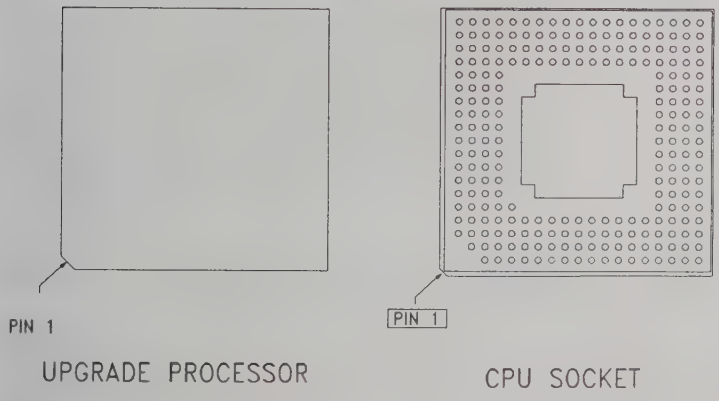


Figure 1-5 Pin 1 of the Upgrade CPU and Socket

5. Set the jumpers on the system board. The jumper configurations are clearly marked on the system board.

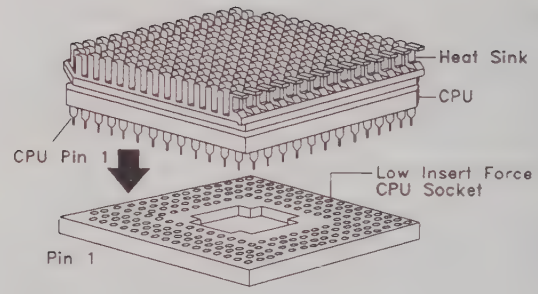


Figure 1-6 Installing an Upgrade CPU

NOTE: *If there is a previously surface-mounted PQFP-type CPU on the system board, the upgrade CPU automatically disables the original system CPU. Make sure to set jumpers J9, J10 and J11 according to the CPU type installed because the signals are different for different CPU types.*

1.5 Upgrading VGA Memory

You can increase VGA RAM to 1 MB. The additional memory allows your VGA memory to display higher resolutions and more colors when the appropriate VGA driver is used. (See Table 1-7.)

Table 1-7 VGA Memory Size and Supported Resolutions

Memory Size	Resolution	Number of Colors
512 KB	640 x 480	256
	800 x 600	256
	1024 x 768	16
1024 KB	640 x 480	16 M
	800 x 600	32 K/64 K
	1024 x 768	256
	1280 x 1024	16

To upgrade the VGA RAM, do the following:

1. Locate the VGA memory expansion sockets on the system board labelled U15, U16, U17 and U29. See Figure 1-7.
2. Gently but firmly insert a 44256 RAM (256 KB bit by 4, 70-ns) chip into each of the VGA memory expansion sockets.

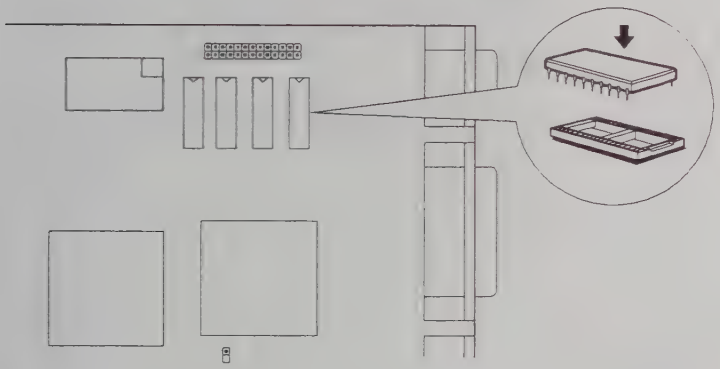


Figure 1-7 Installing the VGA RAM

1.6 Upgrading Cache Memory

To install cache chips, do the following:

1. Locate the cache sockets on the system board. See Figure 1-1.
2. Make sure that the cut edge of the chip is aligned with the cut edge of the cache sockets. See Figure 1-8.
3. Gently but firmly insert the pins until it is securely installed. Be careful not to bend any pins.

IMPORTANT! *If you choose the 8-bit, write-back cache TAG feature, install a 16K x 4, 20-ns cache chip in the socket labelled U51. Make sure to set the correct jumper setting. See Jumper Setting.*

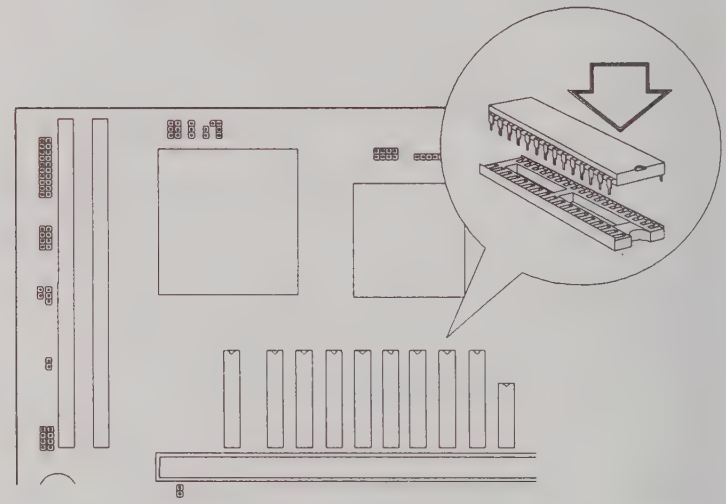


Figure 1-8 Installing Cache

1.7 Using Flash ROM

IMPORTANT! *Unauthorized access is prohibited with password security.*

WARNING! *Do not install memory-related drivers (XMS, EMS, DPMI) when AFlash is used.*

This utility has three functions that support all the operations required for system Flash ROM directly from or to the DOS file. These functions are:

A. **Load BIOS file to buffer** - reads specified file from a diskette to memory for future program use or for check only.

B. **Save BIOS to disk file** - reads BIOS from current BIOS area and writes to file specified by the user.

C. **Program flash memory** - programs Flash memory according to the data loaded in (A). This function also shows BIOS checksum and BIOS type to make sure that the operation is correct.

To use AFlash, do the following:

1. Copy the MSG.DAT and AFLASH.EXE files from the system utilities diskette into a subdirectory of your choice.
2. From that subdirectory, type:

```
Aflash      <Enter>
```

3. A help message appears. Press any key to continue.
4. The main menu appears. Use the up- or down-arrow keys to highlight the options. Press Enter to select.

NOTE: *If warnings or error messages appear, press any key to continue or quit.*

5. If you want to save a copy of the current BIOS into a file, select `Save BIOS to Disk File`.
6. Select `Load BIOS File` to load the BIOS file into memory.
7. Select `Program Flash Memory` to erase the current BIOS, and program Flash ROM.

WARNING! *Do not turn off system power while Flash BIOS is programming. This will destroy the BIOS.*

8. Reboot the system.

A quicker way to load the BIOS file into memory, and program the AFlash ROM is to type:

```
c:\ AFlash  <filename>     <Enter>
```

The program automatically performs the loading and programming functions, then reboots the system.

If the program cannot find the BIOS file, it shows the main menu and flashes this message:

```
Can't Read This File !!!          Press any key to continue ...
```

Follow the procedures for loading and programming BIOS file using the main menu.

Chapter 2

Configuring the System

Most systems are already configured by the manufacturer or dealer. There is no need to run Setup when starting the computer unless you get a Run Setup message.

Run the System Configuration Setup program when you want to do the following:

- install a new system
- install or remove a disk drive
- change the display type
- change password and security features
- change the CPU speed
- disable or enable the cache memory
- reserve the top 1 MB of system memory
- set the date and time
- set the power-management features

The Setup program loads configuration values into the battery-backed, nonvolatile memory called CMOS RAM. This memory area is not part of the system RAM.

NOTE: *If you repeatedly receive Run Setup error messages, check the computer's internal battery. If the battery is dead or not properly connected, the system cannot retain configuration values in CMOS RAM.*

Before running, have the following information ready:

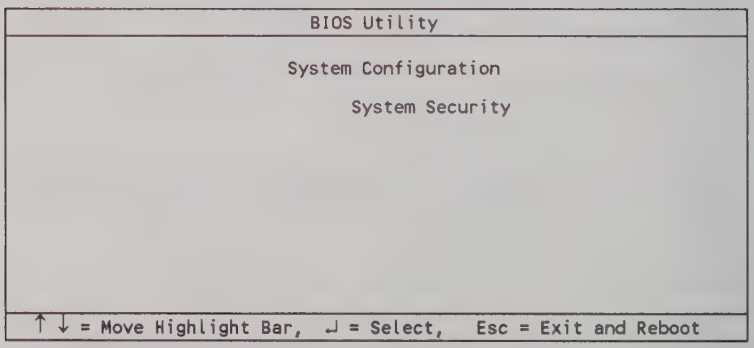
- Diskette drive type. The standard diskette drive type is either 5.25 inch 1.2 MB or 3.5 inch 1.44 MB.
- Fixed disk drive type. To determine your drive type, compare the information on the label pasted to your fixed disk (or supplied in vendor documentation) with the disk types listed in Appendix A.

2.1 Entering Setup

CAUTION: *Close all open files and leave your application program before entering Setup. You cannot exit back into an application. The system automatically reboots when you leave Setup.*

Press the key combination Ctrl-Alt-Esc to enter Setup. You do not need to insert a diskette or load an operating system. Just press the key combination.

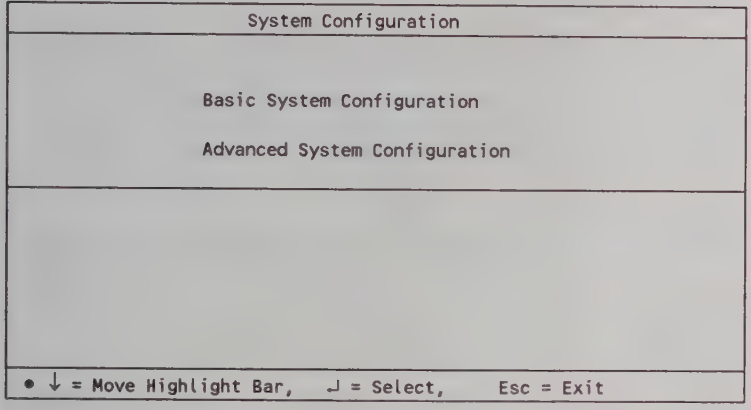
The Setup main menu appears:



Select System Configuration Setup to input configuration values to CMOS memory.

2.2 System Configuration Setup

The screen below shows the System Configuration Setup window:



2.2.1 Basic System Configuration

Select Basic System Configuration to input configuration values such as date, time and disk types.

The screen below shows the Basic System Configuration Setup screen:

```
                    Basic System Configuration                    Page 1
Date  ---------------------- [05/17/93]
Time  ---------------------- [10:40:30]
Diskette Drive A ------------ [None]
Diskette Drive B ------------ [None]
                                          Sector Landing  Write
                                Cylinder Head /Track  Zone  Pre_Comp
Fixed Disk 0 (40 MB) -------- [17]  977    5     17     977    300
Fixed Disk 1 (0  MB) -------- [None]


Base Memory ----------------- [  640] KB
Extended Memory ------------- [ 3072] KB
Total Memory ---------------- [ 3712] KB
Math Coprocessor ------------ [Not Installed]
Video Display --------------- [VGA/EGA  ]

↑↓ =Move Highlight Bar,  →← =Change Setting, PgUp/PgDn=Move Screen
F9=Default Setting,  F10=Bootable Setting,  F1=Help,  Esc=Exit
```

The command line at the bottom of the display has three functions. It tells you how to view the configuration options for each parameter, how to move the highlight bar from one parameter to the next, and how to change the value for each parameter.

1. Press the up- or down-arrow key (on the cursor-edit keypad) to position the highlight bar on the desired parameter.
2. Press the PgUp key to turn to the next page, or press the PgDn key to return to the previous page.
3. After you select the desired option for a parameter, press the appropriate arrow key to move the highlight bar to the next parameter. This option is now set as the configuration value.

4. Press F9 to set all parameters to default settings. The default settings are the values initially stored in CMOS RAM. If you change these settings, you can load the default settings again by pressing F9.

5. Press F10 to select bootable settings. When you add a component to the system, you have to change some settings. If the system does not boot, use the bootable settings to boot the system. To do this, press F10 before you turn on the power and hold it down until you hear two beeps. The system automatically sets the CMOS values to bootable settings.

The screen below shows page 2 of the Basic System Configuration screen:

```
                Basic System Configuration                    Page 2

Communication Settings

    Baud Rate ---------------- [9600] BPS
    Parity ------------------- [ Odd]
    Stop Bits ---------------- [ 1] Bits
    Data Length -------------- [ 7] Bits

Memory Test ------------------ [Enabled]


↑↓ =Move Highlight Bar, → ← =Change Setting, PgUp/PgDn=Move Screen
F9=Default Setting,  F10=Bootable Setting,  F1=Help,  Esc=Exit
```

To use the Help option, press F1. A window appears onscreen with a brief description of the currently highlighted parameter.

The following sections explain the different parameters and their settings.

The Real-Time Clock

The real-time clock keeps the system date and time.

DATE

To set the date, move the highlight bar to the Date parameter. Press the left- or right-arrow key to set the current date, following the month, day, and year format. If you want to change the date, return the highlight bar to the Date parameter and set the new date.

Valid values for month, day, and year are:

Month	1 to 12
Day	1 to 31
Year	00 to 99

TIME

To change the time, move the highlight bar to the Time parameter. Press the left- or right-arrow key to set the current time in the hour, minute, and second format. If you want to change the time, return the highlight bar to the Time parameter and set the new time.

Valid values for hour, minute, and second are:

Hour	00 to 23
Minute	00 to 59
Second	00 to 59

After setting the date and time, you need not set them again. As long as the internal battery remains good and is connected, the clock continues to keep the date and time accurately. When the operating system asks for the date and time, press Enter twice if you do not want to change the values of these parameters.

You can also skip the entry of date and time by creating an AUTOEXEC.BAT file. Refer to the MS-DOS manual.

Diskette Drives

FIRST DISKETTE DRIVE

To enter the configuration value for the first diskette drive (drive A), move the highlight bar to the Diskette Drive A parameter.

```
Diskette Drive A ---------- [XXXXXXXXXX]
```

The five options for this parameter are listed below. Press the left or right arrow key to view the five options and select one that suits your system.

- [Not Present]
- [360 KB, 5.25-inch]
- [1.2 MB, 5.25-inch]
- [720 KB, 3.5-inch]
- [1.44 MB, 3.5-inch]

SECOND DISKETTE DRIVE

If your system has a second diskette drive, move the highlight bar to the Diskette Drive B parameter and follow the same procedure to set the configuration value.

If there is no second diskette drive, select the appropriate option:

```
Diskette Drive B ---------- [Not Present ]
```

Fixed Disk Drives

To set a value for this parameter, you must know the type of fixed disk(s) your system has. Refer to the label pasted on the fixed disk, or see Appendix A for the fixed disk types.

FIRST FIXED DISK DRIVE

To configure the first fixed disk drive (drive C), move the highlight bar to the Fixed Disk 0 parameter:

```
Fixed Disk 0 ------------ [None]
```

Use the left- or right-arrow key to run through the options and select the value that corresponds to your fixed disk type.

NOTE: *If you cannot find the exact type of your fixed disk among the options, use the left- or right-arrow key to set the value to [255]. Press Enter and type the exact values of the disk parameters.*

SECOND FIXED DISK DRIVE

If your system has two fixed disks installed, move the highlight bar to the Fixed Disk 1 parameter and follow the same procedure to set a value for the second fixed disk drive.

If your system does not have a second fixed disk drive, set the value to [None].

```
Fixed Disk 1 ------------ [None]
```

NOTE: *The second fixed disk parameters follow those of the first fixed disk if both disk drives use type [255].*

System Memory

The system automatically detects the total amount of onboard memory and sets the corresponding value in the Setup program. This information is not adjustable by the user and is for display only. If you install additional memory, the system automatically updates the Total Memory parameter to show the new memory size.

```
Base Memory ------------ [  640 ] KB
Extended Memory -------- [ 3072 ] KB
Total Memory ----------- [ 3712 ] KB
```

Math Coprocessor

This parameter is for display only. The option set by the system is:

```
        Math Coprocessor ------- [Not Installed]
```

If you install a coprocessor, the power-on self-test routine detects its presence and automatically reconfigures this parameter to:

```
        Math Coprocessor ------- [Installed   ]
```

Video Display

The video display is the monitor on which the operating system prompt appears when you boot the system. The system automatically detects the video mode of your primary display and sets the configuration value accordingly.

```
        Video Display --------- [VGA/EGA   ]
```

Communication Status

The Communication Status parameters let you set the baud rate, parity, stop bit and data length for the first serial port (COM 1).

- Baud rate: 110 to 9600 bits per second (BPS)
- Parity: odd, even, or none
- Stop bit: 1 or 2 stop bits
- Data length: 7- or 8-bit data word

There is only one restriction on the available options. If your data length parameter is an 8-bit data word, you must select one of the following combinations:

- 0 stop bit and odd (or even) parity
- 1 stop bit and no parity

Default values: are 9600 BPS, odd parity, 1 stop bit, and 7-bit data word.

Memory Test

The system performs a RAM test during power-on self-test (POST) routine. Set this parameter to `Disable` to bypass this test routine.

2.2.2 Advanced System Configuration

Select the `Advanced System Configuration` option to configure the system memory. The screen below shows page one of the Advanced System Configuration screen.

```
                Advanced System Configuration                    Page 1

Shadow RAM
    F0000h - FFFFFh (System BIOS) --------[Enabled]
    C0000h - C7FFFh (Video BIOS)----------[Enabled]
    C8000h - CFFFFh----------------------[Disabled]
    D0000h - D7FFFh----------------------[Disabled]
    D8000h - DFFFFh----------------------[Disabled]
    E0000h - E7FFFh----------------------[Disabled]
    E8000h - EFFFFh----------------------[Disabled]
System Speed ------------------------------[High]
Memory at 15MB-16MB Reserved for ---------[System]

Internal Cache (CPU Cache) ----------------[Enabled]
External Cache  ---------------------------[Enabled]
    Cache Scheme ------------------------[Write Back]
F0000h - FFFFFh (System BIOS) ------------[Cacheable]
C0000h - C7FFFh (Video BIOS) -------------[Cacheable]

↑↓ =Move Highlight Bar, →← =Change Setting, PgUp/PgDn=Move Screen
F9=Default Setting,  F10=Bootable Setting,  F1=Help,  Esc=Exit
```

Shadow RAM

The Shadow RAM parameter allows you to change the system BIOS and video BIOS locations from ROM to RAM. When the system boots, the BIOS routines are copied into the RAM area. Relocating to RAM enhances system performance, as information access is faster than ROM.

To change the BIOS location from ROM to RAM, select `[Enable]`. If you select `[Disable]`, the BIOS information remains in ROM. The default setting for the system BIOS is `[Enable]`. All other RAM shadowing are disabled.

System Speed

This parameter allows you to set the system speed according to the microprocessor installed. Press the left- or right-arrow key to view the available options and select the required value.

```
System Speed --------- [High ]
```

The microprocessor runs at high or low speed. Some software may require a slower operating speed. If your software does not run properly, try setting the system to low speed and disabling the cache memory. The system speed automatically adjusts to low speed when reading or writing to diskettes.

You can also use the key combination Ctrl-Alt-+ to toggle between high and low speed.

Memory at 15MB-16MB

To prevent memory address conflicts between the system and expansion boards, reserve this memory range for the use of either the system or an expansion board.

CPU Cache (Internal Cache)

This parameter enables or disables the internal cache memory.

```
CPU Cache (Internal Cache) -------- [Enabled]
```

External Cache

This parameter enables or disables the external cache memory.

```
External Cache -------- [Enabled]
```

The EPA Power Saving Feature is an optional feature of the BIOS. If your system BIOS supports this feature, press PgDn to view the second page.

IMPORTANT! *The EPA Power Saving Feature is an option. If your system BIOS does not support this feature, EPA Power Saving Feature, this screen does not appear.*

```
                Advanced System Configuration                Page 2

 Power Saving Timer ---------------------[Disabled]

 Activity Selection
   Video RAM Activity ------------------[Disabled]

 Saving Device Selection ----------------[Disabled]
   CPU Down Speed ----------------------[Disabled]
   Monitor Power -----------------------[Suspend ]
   HDD/FDD +12V Power ------------------[Disabled]
   HDD/FDD +5V Power -------------------[Disabled]

↑↓ =Move Highlight Bar, →← =Change Setting, PgUp/PgDn=Move Screen
F9=Default Setting,  F10=Bootable Setting,  F1=Help,  Esc=Exit
```

Power Saving Timer

The system has a built-in power-saving mode in accordance to EPA standards. This parameter sets the timer when the system switches from regular to power-saving mode. Set this parameter to `[Disable]` to disable this function. Valid timer values are: `[30]`, `[60]`, `[90]`, and `[120]` minutes.

Activity Selection

This parameter lets you select the activity that will wake up the system from power-saving mode to normal operating mode, and clear the power saving timer. The default activities are: accessing the parallel port, serial port, keyboard, mouse, floppy and embedded fixed disk. Accessing the video RAM is optional.

Press the up- or down-arrow key to move the highlight bar from one parameter to the next. Press the right- or left-arrow key to change the setting.

2.3.1 Disk Drive Control

The disk drive control features allow you to enable or disable the read/write functions of a disk drive. These features can also control the diskette drive or fixed disk drive boot function to prevent loading operating systems or other programs from a certain drive while the other drives remain operational.

Table 2-1 summarizes the functions of the drive control parameters.

Table 2-1 Drive Control Parameters

Diskette Drive	
Normal	Diskette drive functions normally
Write Protect	Disables the write function
Disable	Disables all diskette functions
Fixed Disk Drive	
Normal	Fixed disk drive functions normally
Write Protect	Disables the write function
Disable	Disables all fixed disk functions
System Boot Drive	
Auto	If drive A exists and the system diskette is inserted, the system boots from drive A; otherwise, it boots from drive C
C:	System always boots from drive C
A:	System always boots from drive A

NOTE: *The drive control settings that you specify take effect only if the diskette and fixed disk controllers are not disabled through jumper settings.*

2.3.2 On-board Communication Ports

SERIAL PORT1

This parameter enables serial port 1 as COM 1 and sets its address.

Table 2-2 Serial Port Parameters

Parameter	Function
Serial 1 (3F8h)	COM 1 with address 3F8h
Serial 2 (2F8h)	COM2 with address 2F8h
Serial 3 (3E8h)	COM3 with address 3E8h
Serial 4 (2E8h)	COM 4 with address 2E8h
Disable	Disables serial port 1

SERIAL PORT 2

This parameter enables serial port 2 and sets its address.

Table 2-3 Serial Port 2 Parameters

Parameter	Function
Serial 1 (3F8h)	COM1 with address 3F8h
Serial 2 (2F8h)	COM2 with address 2F8h
Serial 3 (3E8h)	COM3 with address 3E8h
Serial 4 (2E8h)	COM 4 with address 2E8h
Disable	Disables serial port 2

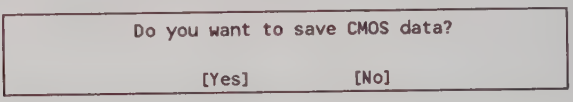
PARALLEL PORT

The system has one parallel port. Table 2-4 lists the options for selecting the parallel port address. You also have the option to disable the parallel port.

2.4 Leaving Setup

Examine the system configuration values. When you are satisfied that all the values are correct, write them down. Store the recorded values in a safe place, such as in this manual. In the future, if the battery loses power, or the CMOS chip is damaged, you will know what values to enter when you rerun Setup.

Press Esc to leave the system configuration setup. If there is any change in the configuration values and security setup, the following screen appears:



Use the direction keys to select your response. Select [Yes] to store the new data in CMOS RAM. Select [No] to retain old configuration values. Press Enter.

Fixed Disk Type Table

Type	Cylinders	Heads	Write Precomp	Landing Zone	Sectors Per Track
0	(indicates SCSI or no fixed disk)				
1	306	4	128	305	17
2	615	4	300	615	17
3	615	6	300	615	17
4	940	8	512	940	17
5	940	6	512	940	17
6	615	4	0FFFFH	615	17
7	462	8	256	511	17
8	733	5	0FFFFH	733	17
9	900	15	0FFFFH	901	17
10	820	3	0FFFFH	820	17
11	855	5	0FFFFH	855	17
12	855	7	0FFFFH	855	17
13	306	8	128	319	17
14	733	7	0FFFFH	733	17
15		(reserved)			
16	612	4	0	663	17
17	977	5	300	977	17
18	977	7	0FFFFH	977	17
19	1024	7	512	1023	17
20	733	5	300	732	17
21	733	7	300	732	17
22	733	5	300	733	17
23	306	4	0	336	17
24	612	4	305	663	17
25	306	4	0FFFFH	340	17
26	612	4	0FFFFH	670	17
27	698	7	300	732	17
28	976	5	488	977	17
29	306	4	0	340	17
30	611	4	306	663	17
31	732	7	300	732	17
32	1023	5	0FFFFH	1023	17

Type	Cylinders	Heads	Write Precomp	Landing Zone	Sectors Per Track
33	751	8	0	0	17
34	755	16	0	0	17
35	731	13	0FFFFH	0FFFFH	26
36	980	15	0FFFFH	0FFFFH	17
37	936	16	0FFFFH	936	17
38	981	5	0FFFFH	981	17
39	981	10	0FFFFH	981	17
40	762	8	0FFFFH	762	39
41	980	5	0FFFFH	980	17
42	832	8	0FFFFH	832	33
43	683	12	0FFFFH	683	38
44	513	16	0FFFFH	513	38
45	776	8	0FFFFH	776	33
46	683	16	0FFFFH	683	38
47	832	6	0FFFFH	832	33
48	615	2	300	615	34
49	989	16	0	989	63
50	823	4	0FFFFH	823	38
51	1001	15	0FFFFH	1001	17
52	1024	7	0FFFFH	0FFFFH	17
53	723	13	0FFFFH	0FFFFH	51
54	548	8	0FFFFH	548	38
55	1013	4	0FFFFH	0FFFFH	41
56	929	15	0FFFFH	0FFFFH	17
57	817	14	0FFFFH	0FFFFH	36
58	723	13	0FFFFH	0FFFFH	36
59	802	4	0FFFFH	802	39
60	1024	9	0FFFFH	1023	17
61	895	5	0FFFFH	0FFFFH	55
62		(reserved)			
63	966	10	0FFFFH	0FFFFH	34
64	1024	8	0FFFFH	1023	17
65	1024	11	0FFFFH	1023	17
66	918	11	0FFFFH	1023	17
67	925	9	0FFFFH	926	17
68	1024	10	0FFFFH	1023	17
69	1024	12	0FFFFH	1023	17
70	1024	13	0FFFFH	1023	17
71	1024	14	0FFFFH	1023	17
72	1024	2	0FFFFH	1023	17
73	1024	16	0FFFFH	1023	17
74	918	15	0FFFFH	1023	17
75	820	6	0FFFFH	820	17
76	1024	5	512	1023	17
77	1024	8	512	1023	17
78		(reserved)			
79	1001	15	0FFFFH	0FFFFH	32
80	1024	16	0FFFFH	0FFFFH	63

Type	Cylinders	Heads	Write Precomp	Landing Zone	Sectors Per Track
81	1024	7	0FFFFH	1223	17
82	1024	11	0FFFFH	1223	17
83	1024	15	0FFFFH	1223	17
84	776	8	0FFFFH	775	33
85	926	13	0FFFFH	926	17
86	805	4	0FFFFH	805	26
87	976	5	0FFFFH	976	17
88	745	4	0FFFFH	760	28
89	747	2	0FFFFH	760	28
90	782	2	0FFFFH	862	27
91	985	13	0FFFFH	0FFFFH	32
92	816	15	0FFFFH	816	32
93	968	5	0FFFFH	0FFFFH	17
94	903	8	0FFFFH	0FFFFH	46
95	966	5	0	0	34
96	535	10	0	0	50
97	715	10	0	0	50
98~100		(reserved)			
255		user defined			

Troubleshooting Error Messages

Whenever you receive an of any type, do not continue using the computer. Note the message and take corrective action. This section describes the different types of error messages and suggests corrective measures.

There are two general types of error messages:

- Software
- System

B.1 Software Error Messages

Software messages are returned by your operating system or application. These messages typically occur after you boot the operating system or when you run your application programs. If you receive this type of message, consult your application or operating system manual for help.

B.2 System Error Messages

A system indicates a problem with the computer itself. It normally appears during the power-on self-test, before the operating system prompt appears. Table B-1 lists system error messages in alphabetical order.

Table B-1 System Error Message Chart

Error Message	Corrective Action
Bad CMOS Battery	Replace battery. Contact your dealer.
CMOS Checksum Error	Rerun the Setup program.
Diskette Drive Controller Error	Check and connect the control cable to the diskette drive or controller.
Diskette Drive Error	Diskette may be bad. If not, replace the diskette drive.
DRAM Configuration Error	Modify DRAM configuration to agree with one of the options in Table 2-2.
Equipment Configuration Error	Rerun the Setup program.
Fixed Disk Controller Error	Check and connect the control cable to the fixed disk drive or controller.
Fixed Disk 0 Error	Check all cable connections. Replace fixed disk.
Fixed Disk 1 Error	Check all cable connections. Replace fixed disk.
Fixed Disk 0 Extended Type Error	Rerun the Setup program.
Fixed Disk 1 Extended Type Error	Rerun the Setup program.
I/O Parity Error	Contact your dealer.

Table B-1 System Error Message Chart (continued)

Error Message	Corrective Action
Keyboard Error	Check and connect keyboard to the system unit.
Keyboard Interface Error	Contact your dealer.
Keyboard Locked	Unlock the keyboard.
Memory Error	Check SIMMs on the system board. Contact your dealer.
Memory Size Mismatch	Rerun Setup.
Parallel 1 Conflict, Disable On-Board Parallel 1	Rerun Setup.
Parallel 2 Conflict, Disable On-Board Parallel 2	Rerun Setup.
Parallel 3 Conflict, Disable On-Board Parallel 3	Rerun Setup.
Pointing Device Error	Check and connect pointing device.
Pointing Device Interface Error	Contact your dealer.
Press F1 key to continue or Ctrl-Alt-Esc for Setup	Press F1 or Ctrl-Alt-Esc.
Press F1 to Setup or other key to continue	Press F1 and reconfigure the system.
Press Esc to turn off NMI, any other key to reboot	Press Esc to disregard NMI error. Press any other key to reboot the system.

Table B-1 System Error Message Chart (continued)

Error Message	Corrective Action
Protected Mode Test Fail	Contact your dealer.
RAM BIOS Error	Contact your dealer.
RAM BIOS not supported for AST 3G Plus II. Check Setup.	AST 3G Plus II present on system board.
RAM Parity Error	Check SIMMs on system board or contact your dealer.
Real Time Clock Error	Rerun Setup.
Serial 1 Conflict, Disable On-Board Serial 1	Rerun Setup.
Serial 2 Conflict, Disable On-Board Serial 2	Rerun Setup.
Shadow RAM Fail	Contact your dealer.
System Memory Address Error	Check SIMMs on system board or contact your dealer.

B.3 Correcting Error Conditions

As a general rule, if an error message says "Press F1 to continue," it is caused by a configuration problem, which can be easily corrected. An equipment malfunction is more likely to cause a fatal error, i.e., an error that causes complete system failure.

Here are some corrective actions for error messages:

1. Run Setup. You must know the correct configuration values for your system before you enter Setup, which is why you should write them down when the system is correctly configured. An incorrect Setup configuration is a major cause of power-on error messages, especially for a new system.

2. Remove the system unit cover, following the directions in the system housing installation guide. Check that the system board and any expansion boards are set correctly.

3. If you cannot access a new disk, it may be because your disk is not physically formatted. Physically format the disk first using the FDISK and FORMAT commands.

4. Check that all connectors and boards are securely plugged in. Review the system housing installation guide for assistance.

CAUTION! *Integrated circuits (ICs) are extremely susceptible to damage from electrostatic discharge. Do not handle ICs unless you are a qualified service technician, using tools and techniques that conform to accepted industry practices.*

If you go through the corrective steps above and still receive an error message, the cause may be an equipment malfunction.

If you are sure that your configuration values are correct and your battery is in good condition, the problem may lie in a damaged or defective chip. Contact an authorized service center for assistance.

Address Maps and Interrupt Table

C.1 System Memory Map

Table C-1 System Memory Map

Address Range (hex)	Definition	Function
000000 - 09FFFF	640 KB system memory	Reserved for operating system
0A0000 - 0BFFFF	128 KB video RAM	Graphics display buffer
0C0000 - 0C7FFF	32 KB Video BIOS	Video BIOS
0C8000 - 0DFFFF	96 KB I/O expansion ROM	Reserved for ROM on I/O adapters
0E0000 - 0EFFFF	64 KB ROM	Reserved on system board
0F0000 - 0FFFFF	64 KB BIOS	System ROM BIOS
100000 - FDFFFF	System RAM BIOS (DRAM) Main memory	
FE0000 - FFFFFF	128 KB system ROM	Select the same ROM locations as 0E0000 - 0FFFFF

C.2 I/O Address Map

Table C-2 I/O Address Map

Address Range (hex)	Device
000 - 01F	DMA 1, 8237
020 - 027	Interrupt 1 8259
030 - 037	Interrupt controller 1 8259
040 - 047	System timer (8254 - 1)
050 - 057	System timer (8254 - 1)
060 - 06F	Keyboard 8742
070 - 07F	Real time clock, NMI mask
080 - 09F	DMA page register 74LS612
0A0 - 0BF	Interrupt controller 2 8259
0C0 - 0DF	DMA controller-2 8237
0F0	Clear math coprocessor busy
0F1	Reset math coprocessor
0F8 - 0FF	Math coprocessor
1F0 - 1F8	Fixed disk drive controller
178, 17A	Power-saving port
278 - 27F	Parallel printer port 2
2F8 - 2FF	Serial asynchronous port 2
35F, 36F	Power-saving port
37F	System reserved
F37F	System special port
378 - 37F	Parallel printer port 1
3F0 - 3F7	Diskette drive controller
3F8 - 3FF	Serial asynchronous port 1

C.3 Interrupt Levels

Two interrupt controllers (a master and a slave) are cascaded in the system board so that 15 interrupt levels are possible. The base I/O address for interrupt controller 1 (master) is hex 20; for interrupt controller 2 (slave), hex A0. The table below shows the interrupt levels.

Table C-3 Interrupt Table

Priority	Controller Number	Interrupt Number	Interrupt Source
1	0	NMI[1]	Parity error detected
2	1	IRQ 0	Interval timer, counter 0, output[2]
3	1	IRQ 1	Keyboard[2]
	1	IRQ 2	Interrupt from controller 2 (cascade)
4	2	IRQ 8	Real-time clock[2]
5	2	IRQ 9	Cascaded to INT 0AH (IRQ 2)
6	2	IRQ 10	Reserved
7	2	IRQ 11	Reserved
8	2	IRQ 12	PS/2 mouse[2]

1 The NMI signal is controlled through I/O port hex 70, bit 7.
2 Device preinstalled and interrupt level used

Table C-3 Interrupt Table (continued)

Priority	Controller Number	Interrupt Number	Interrupt Source
9	2	IRQ 13	INT from 80387 coprocessor[2]
10	2	IRQ 14	Fixed disk controller[2]
11	2	IRQ 15	Reserved
12	1	IRQ 3	Serial communication port 2[2]
13	1	IRQ 4	Serial communication port 1[2]
14	1	IRQ 5	Reserved
15	1	IRQ 6	Diskette controller[2]
16	1	IRQ 7	Parallel port 1[2]

2 Device preinstalled and interrupt level used

MP MASTER
MA25715